

Re-Entry: Online virtual worlds as a healing space for veterans

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ABSTRACT

We describe a project designed to use the power of online virtual worlds as a place of camaraderie and healing for returning United States military veterans—a virtual space that can help them deal with problems related to their time of service and also assist in their reintegration into society. This veterans' space is being built in Second Life[®], a popular immersive world, under consultation with medical experts and psychologists, with several types of both social and healing activities planned. In addition, we address several barrier issues with virtual worlds, including lack of guides or helpers to ensure the participants have a quality experience. To solve some of these issues, we are porting the advanced intelligence of the ICT's virtual human characters to avatars in Second Life[®], so they will be able to greet the veterans, converse with them, guide them to relevant activities, and serve as informational agents for healing options. In this way such "avatar agents" will serve as autonomous intelligent characters that bring maximum engagement and functionality to the veterans' space. This part of the effort expands online worlds beyond their existing capabilities, as currently a human being must operate each avatar in the virtual world; few autonomous characters exist. As this project progresses we will engage in an iterative design process with veteran participants who will be able to advise us, along with the medical community, on what efforts are well suited to, and most effective within, the virtual world.

Keywords: Virtual worlds, immersive, healing, Second Life, veterans, social networking

1. INTRODUCTION

This paper describes a project that brings the power of immersive virtual worlds together with a real world need: helping returning soldiers reintegrate to civilian life. When our military men and women have served their tours of duty, it is often difficult for them to take up their former lives. They may need physical or mental help to make the adjustment from warrior to normal member of society. And, while our soldiers have access to the best physical care in the world, getting help for war-related emotional or psychological issues often carries an associated stigma that prevents many individuals from obtaining the help they need. Current immersive therapies, such as those that use virtual reality environments to treat Post-Traumatic Stress Disorder (PTSD) [1], are not widespread, and many individuals who might benefit from them are not able to access them. In addition, society has not shared the intense wartime experiences that soldiers have lived through, and thus veterans are often unwilling to discuss such things with civilians. Returning soldiers could benefit from support groups, but they may not readily seek out such treatments. Another problem is that today's returning soldiers are most likely geographically dispersed and unable to get together with comrades in person on a regular basis. Psychological, physical or social factors may also prevent soldiers from attending live meetings, subsequently missing beneficial interactions with others.

Rather than simply accept that these people will not come to a therapist or support group, what if both camaraderie and certain therapies were easily accessible to soldiers in the privacy of their homes, without having to go anywhere but to their computer? What if this space had resources they could access, and friends they could meet, as well guides that were available 24/7? If this were the case, veterans might feel less isolated and be more inclined to participate regularly and obtain the help they need.

Our proposed solution is to set up a space within the online virtual world Second Life[®], which addresses both the social needs of veterans, and also informs them of certain therapies that they might find beneficial. The social space provides a connected network where soldiers can find companionship with others who have gone through recent wartime experiences. In this regard, the online environment serves much the same functions as did the twentieth century

Veterans of Foreign Wars (VFW) Halls, where returning veterans benefited from socializing with others who shared similar experiences. The therapeutic offerings within our veterans' space will provide a number of Complementary and Alternative Medicine (CAM)-based interventions, determined in conjunction with appropriate medical experts. [2] These CAM interventions are voluntary and designed to be enjoyable, and may be perceived as less threatening than conventional clinical treatments. CAM therapies can include activities like meditation—which experts have shown reduces mental anxiety and aggravation, and games—which can provide enjoyment and a sense of challenge and accomplishment.

1.1 Post-deployment readjustment

Recent studies by the Walter Reed Army Medical Center and the Army Research Institute (ARI) found that soldiers often take six months or more after they return home to self-report mental health concerns. A longitudinal study of 88235 veterans from Operation Iraqi Freedom/Operation Enduring Freedom, conducted with permission by the Walter Reed Army Institute of Research Human Use Review Committee and using the Post-Deployment Health-Assessment (PDHA) and reassessment (PDHRA), found significant increases in self-reported mental health concerns after a six-month period:

Soldiers indicated more mental health distress on the PDHRA than on the PDHA and were referred at higher rates [...] mental health concerns also increased substantially, including PTSD (active, 11.8% to 16.7%; reserve, 12.7% to 24.5%), depression (active, 4.7% to 10.3%; reserve, 3.8% to 13.0%), and overall mental health risk (active, 17.0% to 27.1%; reserve, 17.5% to 35.5%). [3]

This signals that a longer period of time may be required to assess the mental health of our soldiers, since they may not initially exhibit symptoms but may come to require treatment at a later stage. The research indicates an increased need for mental help after the *six-month interval*, since soldiers might have delayed onset and recognition of mental health problems.

Another study, by the Rand research corporation, found that soldiers might not seek treatment for psychological disorders because they believe doing so will damage their careers – the stigma problem. This is the study that also determined current immersive treatments based on virtual environment exposure therapy are not currently offered in enough places to serve the large population that could benefit from them. [4]

Along with stress-related disorders, many soldiers return with debilitating physical injuries that may make them reluctant to go out in public to participate in real world social events. These soldiers could benefit from support groups, and a gradual re-introduction to society, but they may not be ready or able to seek out conventional treatments.

Second Life[®] provides a safe environment for soldiers dealing with such issues. This space, where soldiers can access treatment information and resources, engage in activities, and hang out with other veterans, may create an awareness of symptoms during and beyond the six month time frame and encourage them to access appropriate traditional or alternative therapies. Soldiers can retain a sense of anonymity within the virtual world, as a person's avatar has a fictitious name and real names are not generally shared. They can choose to explore areas on their own time, with no pressure from doctors or timeframes.

The online space also solves the issue of soldiers being geographically dispersed and unable to get together with comrades in person on a regular basis. It can mitigate other psychological, physical or social factors that may prevent soldiers from attending live meetings, subsequently missing beneficial interactions with others. Because the space and other people can be accessed easily through one's own computer, geography and disabilities are no longer barriers, and therefore veterans can socialize with others for restorative purposes, aiding in the re-integration process.

1.2 Using virtual worlds

Many of today's soldiers are comfortable playing video games and using online social networks, and therefore a virtual game-like community that presents such opportunities can be an effective mode for bringing needed information to this

population. Today's soldiers are part of the "digital generation" that has grown up with technology and as such is more willing to use technology to reflect on their experiences. [5] As prior research has indicated, video games may create more emotionally resonant experiences for players, and so provide better a better environment for training and conveying important information to soldiers. [6] [7] [8] Many video game theorists attribute the engaging qualities of video games and games in general to their ability to provide meaningful, pleasant and challenging experiences. [9] [10]

In *Exodus to the Virtual World*, Edward Castronova argues that "media in general, and video games in particular, grab our attention by presenting objects that are relevant to the basic motivation of any organism, namely, to survive." [11: 96] Castronova notes that a game environment, which motivates players to act upon simulated situations of varying emotional states, elicits cognitive responses. Psychologist Mihalyi Csikszentmihalyi says video games encourage a state of "flow", a "merging of action and awareness." [12: 40] This occurs because a player is challenged by games to pursue rewards by integrating and executing game mechanics to their advantage. Hence, the challenges of video games within our space can create a visceral, emotional response in the player, which provides a sense of mastery and accomplishment. The ability of video games to stimulate such responses within a safe environment creates incentives for soldiers to interact with each other without worrying about social or physical constraints.

Virtual environments can also create an opportunity for working out personal issues. Clinical psychologist Sherry Turkle maintains the environments provided by computers give us an opportunity to "(think) through and (work) through personal concerns" by providing "a series of second chances for adults to work and rework unresolved personal issues." [13: 159] In fact, recent studies have shown that regular therapy and virtual reality therapy can be equally effective in offering treatment for social anxiety or other phobias. [14] [15] [16] And, since a person in a virtual world can be anonymous, they may feel more comfortable interacting with others. The same person may have difficulty interacting in physical contexts due to social or physical challenges.

However, there are still problems with virtual world use. One of the main ones is that people are often confused and at a loss to know what to do when they actually arrive in the virtual space, especially if there are no other people around. This leads to boredom and thinking that the virtual space is "lame" even if it is full of exciting activities. If there are people within the virtual world these issues can be alleviated: someone is always around to talk to, answer questions, or provide suggestions. However, this is not always practical. Given that a person can log into the system anytime of day or night, there will inevitably be times when others are not present. Yet staffing a virtual world with knowledgeable people is equally impractical and, in most cases, cost prohibitive. What is needed is a guide that can be there at all times, ready to ask and answer questions and to direct soldiers to the site's offerings, especially those that might appeal to their specific needs. However, virtual worlds currently require a human being behind each character in the environment.

1.3 Virtual human intelligence in virtual worlds

Our solution to this last problem is to implement intelligent virtual humans with advanced artificial intelligence to serve as these guides. A key research component of our effort will be to implement the ICT's extensive expertise in intelligent virtual humans within the virtual world characters. This requires connecting functionalities of the existing virtual human infrastructure to control of an autonomous avatar/agent in Second Life®. The current software supporting the ICT's virtual humans is modular, with components that include natural language processing, text to speech, and control of gestures that the agent can express. We are matching the functionality available through the Second Life scripting language to the virtual human intelligence modules. This will set the stage for agents to populate the virtual world space, serving as guides at first within this project, but eventually taking on other roles, such as tutors and mentors, that can benefit soldiers in many areas beyond our veterans' center.

The use of an intelligent agent in Second Life® will help make the online world a more inviting place. First time visitors would have someone to acquaint them with what is available in the space, even if no one else is around. Further, the use of an intelligent agent can help match the interests of the visitor to various available activities, and assist in helping find potential treatments specialized to their needs. In addition, new games, alternative therapies, and other new areas can be relayed to regular players when they come back to the world.

For our initial work we are focusing specifically on understanding and production of textual chat, a primary form of communication within Second Life®. Simple gestures can also be performed by embedding animation commands within the output text stream. We will modify the current tool used for controlling ICT's classification-based characters (such

our Sgt Blackwell virtual character) to have a Second Life[®] chat interface. This will take in typed text from another Second Life[®] participant, compare it against an assembled knowledge base of known inputs, and use cross-language information retrieval techniques to select the most appropriate pre-composed output based on similarity of the new input to the known inputs. [17] This will allow construction of new characters specifically for this guide domain. Feedback from interactions will be used to extend the input set for the characters such that they will improve as more people use them.

On the output side, we will consider production of speech, more complex production of gestures, movement, and in-game actions. We will consider using intelligent body controllers to the extent possible to automatically generate synchronized motion from a text string. On the reasoning side, we will consider the possibility of using other more advanced understanding, reasoning, and text generation mechanisms, to increase the sophistication and tailoring of the virtual human behavior to the specific context. The dialogue capability will give the user the ability to say anything, however only a limited domain of discourse can be responded to productively.

2. DESIGNING AND BUILDING THE SPACE

As mentioned previously, the veterans' center will contain three main areas: one for social activities and events, one for resources that will contain information for self-assessment and available CAM interventions, and shared gaming areas for collaborative and competitive games. The CAM activity area will contain separate spaces for private meditation, sound and music therapy, and healing activities such as a walkable labyrinth.

To create these areas we are building assets specifically for Second Life[®] (models, textures, animations, and audio), designing the activities, and writing scripts to implement them, as well as creating custom animations for the CAM activities. Second Life[®] has its own proprietary modeling system based on solid geometry as opposed to more commonly used surface models. Because of this, most models for this virtual world must be built using the in-world interface provided. Animations can be created in standard animation packages or motion capture systems and uploaded to the Second Life[®] client. Textures and sounds are also created outside the client and then uploaded to be combined with the other in-world modeled assets.

2.1 Matching the space to the veterans' mindset

A previous environment we had made in Second Life[®] for another project contained an implementation of a typical Iraqi village. This was set up to be a non-threatening space, with no signs of conflict, only standard village characters, buildings, marketplaces and a mosque. We had early plans to use this area as a quiet place of meditation for the veterans, where they could see familiar scenes minus the overlay of war. When I asked a veteran, who was already a Second Life[®] player, if he would give me his thoughts on this plan, he agreed to go to the village with me. I teleported him to the desert area outside the village proper. I started to describe why we had originally made the village environment, but noticed he had disappeared. Even though he was no longer next to me I was able to send him an instant message within world. I said I thought I had lost him and he replied that he couldn't stay in that place. The desert environment was too real for him and brought back extremely painful memories, and he couldn't even get near the village itself. Another veteran was able to go through the village with me, but afterwards he said that it was disturbingly realistic and he did not believe that any veteran should be allowed to explore the village without a therapist at his side. Continued conversations with these two people underscored for me the severity of the issues soldiers must grapple with, and provided a different direction for the design of the veterans' center. (The village itself is currently being evaluated as a possible environment for assessment and clinical exposure treatment by trained PTSD therapists.)

2.2 Access

Lindens Labs, the parent company of Second Life[®], has made an open source version of their Second Life[®] viewer available to developers. Using this, we are creating a customized interface for our target users that will register veterans as part of a select group that has the only access to the space. This ensures that soldiers are the primary visitors; it will not be available to the mainstream Second Life[®] population.

2.3 Modeling and design

Social Center

The social area of the space is built to resemble a large ski lodge in the mountains. (Figure 1) This design was chosen to be as different as possible from the desert environments of Iraq, given the difficulty many veterans have with that type of terrain (per the example reported earlier). Much attention has been given to make the lodge warm, inviting, and comfortable, with several large fireplaces, grouped seating areas to encourage conversation, and homey details such as photos of historical Army ski lodges decorating the walls. (Figures 2 and 3)

The side wings of the ski lodge contain various activities and games, such as bowling, pool, darts, and board games. We are also creating a set of new collaborative and competitive games that can be played by groups of four to sixteen players, for which visible scoreboards (or “bragging boards”) will be prominently displayed.

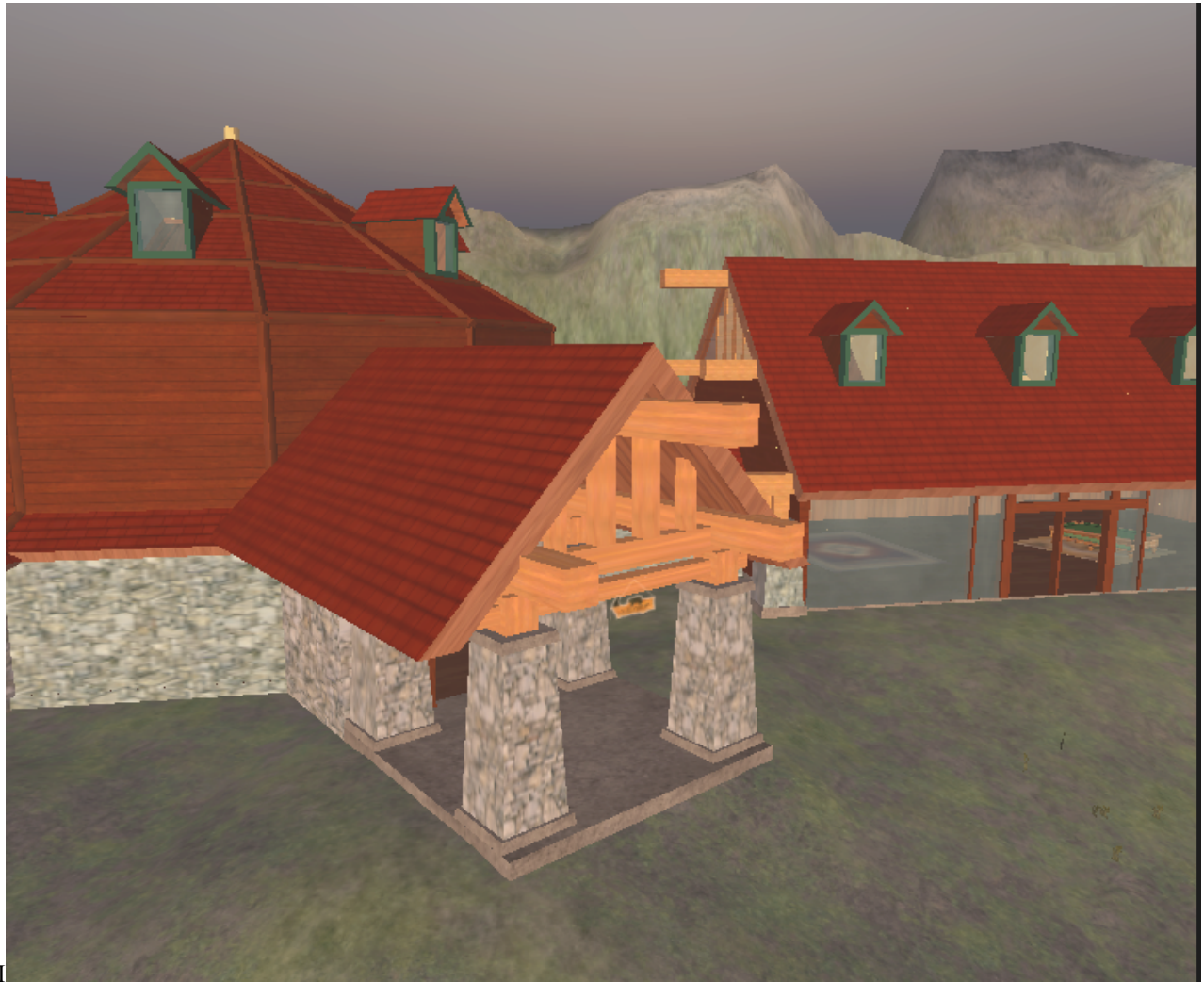


Figure 1. The outside of the virtual ski lodge for veterans. The main entrance leads to a large central circular room designed for social activities. One of the side wings where games are housed can be seen off to the right of the entrance. Snow will be added in the future.



Figure 2. A small seating area in the center section of the lodge, designed to facilitate conversation, suitably decorated.



Figure 3. One of three fireplaces in the central section of the ski lodge, with animated fire accompanied by appropriate sounds of a crackling fire.

Complementary and Alternative Medicine area

The National Institutes of Health (NIH)-sponsored National Center for Complementary and Alternative Medicine Research (NCCAM) promotes an integrated approach to treating illness. It focuses on providing intervention strategies

that promote a person's health through various relaxation techniques, self-reflection, and cognitive behavioral therapy. [18] The aim of CAM treatments is not to replace traditional clinical treatments, but instead to provide positive adjustments in a person's life that may work in addition to any clinical intervention. The use of CAM techniques has been recognized by the Department of Defense (DoD), which through the Defense Center of Excellence (DCoE) for Psychological Health (PH) and Traumatic Brain Injury (TBI) is currently studying the use of CAM in helping soldiers recover from the war. [19] We will consult with these experts in our implementation of CAM activities.

The Complementary and Alternative Medicine area will be an inviting place that both informs veterans and encourages them to try out CAM interventions. The main categories of CAM include whole body approaches, mind-body medicine, biologically based substances such as herbs and vitamins, bodywork such as massage, and energy therapies such as eastern movement activities. We will focus primarily on the mind-body and movement areas. Activities planned include guided meditation, sound and music therapy, movement flow exercises, breathing exercises, positive visualization, mindfulness activities and even a large labyrinth designed for healing that can be traversed.

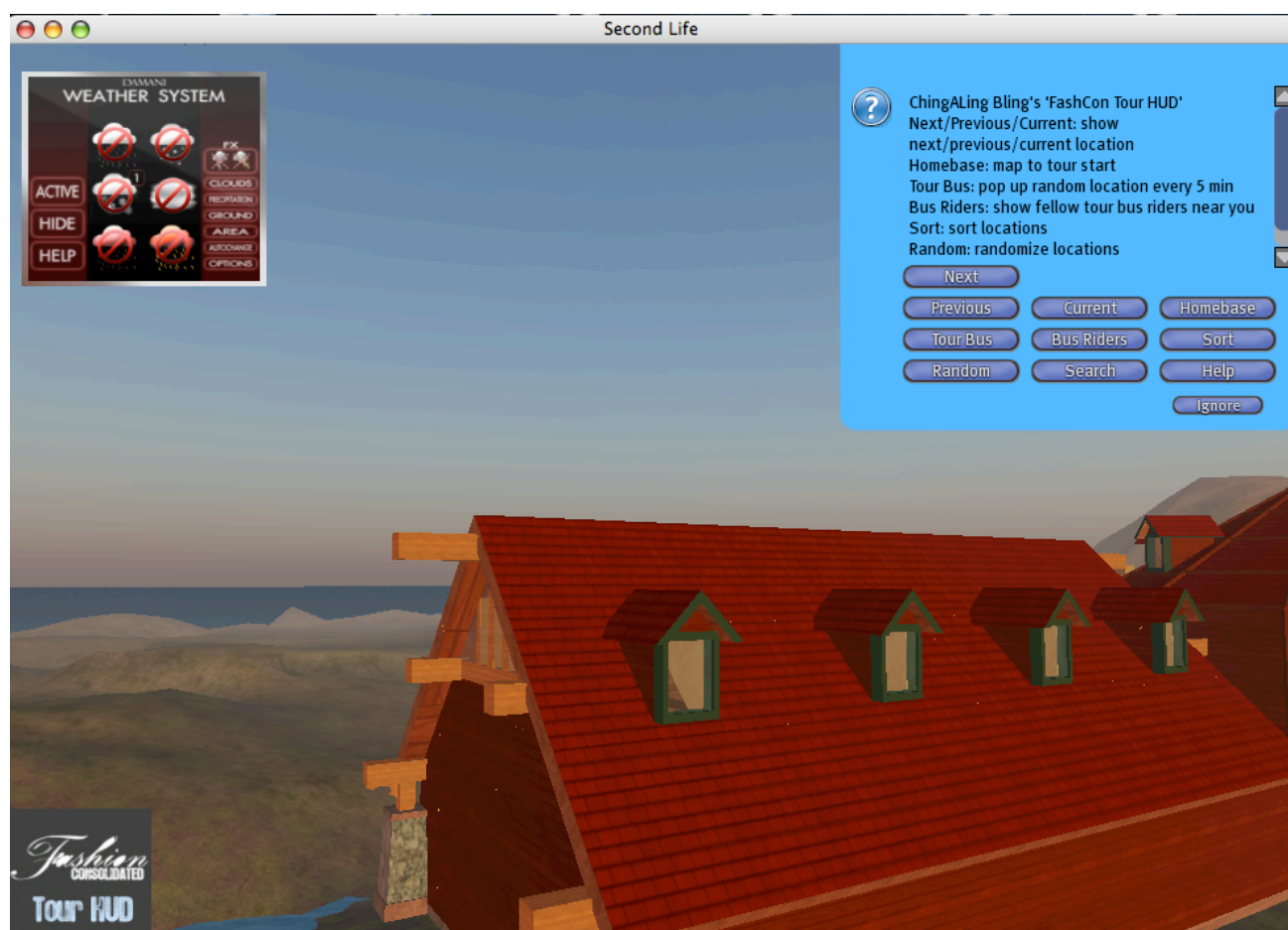


Figure 4. Screen shot showing typical HUD with choices that can be implemented in the viewer, and that is only seen by the individual user who is running it.

The Resource area

This is a multi-faceted area, as it will cover information about a wide variety of subjects. The resource area can provide access to outside websites, such as ones from the Veterans Administration or the Walter Reed Army Hospital, or provide more information about which traditional therapies a person might consider and where to find them. Some activities in the resource area will encourage veterans to self reflect and self assess their state of mind, for example, by letting them know what is (or isn't) normal behavior, or by comparing mindsets appropriate to the warrior (e.g. aggressive driving) to what is more in keeping with civilian roles (e.g. calm, defensive driving). The virtual human agents will be implemented

as guides that help each person find the information most appropriate to him or her. We are also cognizant of the perceived stigma some veterans might feel if others can observe what they are choosing to look at, and therefore have devised a more discreet method for exploring some of the information and therapies. We utilize a common, yet neutral interface through which information can be accessed in (virtual) privacy. For example, clicking on a book object, or an information “box,” will provide the veterans’ center visitor with a (virtually) wearable device known as a Heads Up Display or HUD, that presents choices and data to the person only on their own window interface; insuring no one else can see what they are choosing to explore. (Figure 4)

3. FUTURE AND ONGOING WORK

We are currently in the first year of this effort in which the focus is on building the space and implementing the agent avatars for our virtual human technology. Evaluation studies will commence in the second and subsequent years of the project. We will focus on two kinds of studies: 1) qualitative studies to determine ease of use, and perceived benefit to users, and 2) quantitative studies that look at how often each offering within the space is accessed. In addition we will evaluate the conversational data collected from interactions between veterans and the intelligent agents. This data will be used to 1) refine, expand and improve the corpus of responses the agents have, and 2) analyze typical usage patterns. Longitudinal studies can also be done. Methods can be applied in Second Life® to collect many types of data beyond the conversations, such as how often a user visits a certain spot, how much time they spend there, and what types of activities they engage in. Questionnaires can also be distributed in world or through a web-based database.

With these efforts we hope to make a positive difference in the tools soldiers have at their disposal to find their way back to the society they have so selflessly served.

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REFERENCES

- [1] Rizzo, A., Pair, J., Graap, K., McNerney, P., Wiederhold, B., Wiederhold, M., Spira, J. “A Virtual Reality Exposure Therapy Application for Iraq War Military Personnel with Post Traumatic Stress Disorder: From Training to Toy to Treatment.” In: Roy, M. (Ed.). NATO Advanced Research Workshop on Novel Approaches to the Diagnosis and Treatment of Posttraumatic Stress Disorder. IOS Press, Washington D.C., 235-250. (2006).
- [2] CAM is a growing and respected aspect of treatments endorsed by the National Institutes of Health. (See <http://nccam.nih.gov/health/whatisacam/>). It includes a wide range of biological and psychological interventions. The National Center for Complementary and Alternative Medicine is a federal agency that leads research in the effectiveness of CAM treatments.
- [3] Milliken, C.S. Auchterlonie, J.L., Hoge, C.W. “Longitudinal Assessment of Mental Health Problems Among Active and Reserve Component Soldiers Returning From the Iraq War.” Journal of American Medical Association 298, 2141-2148. (2007).
- [4] Rand Corporation (Rand Health Division and Rand National Security Research Division). “Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery.” Retrieved June 12th, 2008 from The Rand Organization Website: <http://www.rand.org/multi/military/veterans> (2008).
- [5] Prensky, M. Digital Game-based Learning. New York: McGraw-Hill. (2001).
- [6] Rickel, J. “Intelligent Virtual Agents for Education and Training: Opportunities and Challenges.” Intelligent Virtual Agents 2001, pp. 1611-3349. Berlin: Springer. (2001).

- [7] Rickel, J, Marcella, S., Gratch, J., Hill, R, Traum, D & Swartout, W. "Toward a New Generation of Virtual Humans for Interactive Experiences." IEEE Intelligent Systems 17(4), 32-38. (2002).
- [8] Tortell, R & Morie, J. "Videogame play and the effectiveness of virtual environments for training." Conference Proceedings of the Interservice/Industry Training, Simulations and Education Conference (I/ITSEC) (2006).
- [9] Crawford, C. Chris Crawford on Game Design. Berkeley, CA: New Riders. (2003).
- [10] Johnson, S. Everything Bad is Good for You. New York: Riverhead/Gardners. (2005).
- [11] Castronova, E. Exodus to the Virtual World. New York: Palgrave/MacMillan. (2007).
- [12] Csikszentmihalyi, M. Beyond Boredom and Anxiety. San Francisco, CA: Josey-Bass. (1975).
- [13] Turkle, S. "Constructions and Reconstructions of Self in Virtual Reality." In S. Kiesler (Ed.) *Culture of the Internet* (pp. 143-155). Hilldale, New Jersey: Lawrence Erlbaum Associates. (1997).
- [14] Harris, S.R., Kemmerling, R.L., & North, M.M. "Brief Virtual Reality Therapy for Public Speaking Anxiety." *CyberPsychology & Behavior*, 5(6): 543-550. (2002).
- [15] James, L.K., Lin, C.Y., Steed, A., "Social anxiety in virtual environments: results of a pilot study." *CyberPsychology & Behavior* 6:237-243. (2003).
- [16] Klinger, E., Bouchard, S., Légeron, P., Roy, S., Lauer, F., Chemin, I., & Nugues, P. "Virtual Reality Therapy Versus Cognitive Behavior Therapy for Social Phobia: A Preliminary Controlled Study." *CyberPsychology & Behavior* 8 (1): 76-88. (2005).
- [17] Leuski, A., Pair, J., Traum, D., McNerney, P., Georgiou, P., & Patek, R. "How to talk to a hologram." Proceedings of the 11th International Conference on Intelligent User Interfaces (IUI'06), pages 360-362 (Sydney, Australia, January 2006)
- [18] National Center for Complementary and Alternative Medicine. "Cambasics." Retrieved June 12th, 2008 from The National Institutes of Health Website: <http://nccam.nih.gov> (2008).
- [19] Defense Center of Excellence for Psychological Health and Traumatic Brain Injury. "Military Psychological Health Research – Complementary and Alternative Strategies." Retrieved, June 12th, 2008 from The Military Health Center website: <http://www.health.mil/content/docs/pdfs/DCoE/DCoE BAA.pdf> (2008).